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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/813,115

03/31/2004

Eric J. Strang

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EXAMINER

TUROCY, DAVID P

ART UNIT

PAPER NUMBER

1762

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
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3 MONTHS

01/05/2007

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

Office Action Summary

Application No.

10/813,115

Applicant(s)

STRANG, ERIC J.

Examiner

David Turocy

Art Unit

1762

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 10/30/2006.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-38 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-38 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____

DETAILED ACTION

Response to Arguments

1. Applicant's arguments filed 10/30/2006 have been fully considered but they are not persuasive.

The applicants have argued against the Chen reference, stating that the reference fails to disclose a controller configured to pulse an RF power to the substrate holder. The examiner respectfully disagrees. It appears as though the applicant is narrowly interpreting the claim to require the RF power supply to be physically connected to the substrate holder, however, such is not required by the claim. The claim only requires the controller to pulse an RF power to the substrate holder, which is taught by Chen, where the pulsed power is supplied to the showerhead and the pulses will at least partially travel to the grounded substrate, see for example figure 2.

Therefore, at the very least, the controller is configured to pulsed RF power to the showerhead and is thus configured to pulse an RF power to the grounded substrate holder. See also 0041-0042, which discloses applying an RF power to the substrate support and/or showerhead 170. Therefore, while the examiner maintains the anticipation rejection, at the very least it would have been obvious to one of ordinary skill in the art to have pulsed RF power to the substrate holder in Chen as shown in the figures because Chen discloses selectively supplying RF power to the substrate support.

The applicants have argued against the Chen reference stating the reference only pulses RF power on and off and fails to ignite a plasma. However, such is not the

case, the claim does not require two independent power sources or even two independent process steps, but rather, only requires a process that "comprises" igniting a plasma and pulsing a plasma to the substrate holder. The first pulse of Chen may be deemed as igniting the plasma and the subsequent pulses may be deemed to start the RF pulsing to the substrate holder as discussed above. Or alternatively, the first pulse can ignite the plasma as well as start the RF pulsing to the substrate holder.

Claim Rejections - 35 USC § 102

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

3. Claims 1-8, 17-19, and 22-38 are rejected under 35 U.S.C. 102(e) as being anticipated by Chen et al. (US 2003/0143328 A1).

Chen teaches and plasma ALD process in which a first reactant is continuously fed and a second reactant is pulsed. RF power is also pulsed (figures 6, 7, and 10; paragraphs 55-58). The claimed reactants are taught (paragraph 59). The carrier gases are taught (paragraph 66). The different embodiments of figures 6, 7, and 10 read on the different claimed embodiments of the RF pulse being offset or in sync with the second reactant pulse and having corresponding widths and/or periods.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claims 20 and 21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Chen et al. (US 2003/0143328 A1).

Chen teaches the limitations above. However, with respect to these claims, the first and second reactants (the first one being fed continuously and the second being pulsed) are switched. Therefore, Chen fails to explicitly teach continuously feeding the metal containing precursor while pulsing the hydrogen reactant. Regardless, Chen does teach that the hydrogen will not react with the metal containing precursor when the RF power is off (paragraph 56). Selection of which material is pulsed and which is fed continuously is therefore arbitrary in terms of the success of the process. Chen bases the selection of pulsing the metal-containing precursor on cost (continuously feeding hydrogen is less expensive than continuously feeding the metal containing reactant). It would have been obvious at the time the invention was made to a person having ordinary skill in the art to continuously feed the metal containing reactant. By doing so, one would have a reasonable expectation of success in situations where cost is not a factor, as Chen teaches that the reactants only react in the presence of the plasma created by the RF power.

5. Claims 9-16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Chen et al. (US 2003/0143328 A1) as applied to claim 1 above, and further in view of Wiegand (US 4,713,662).

Chen teaches the limitations above, but is silent to the means of pulsing the RF power. However, Wiegand teaches an apparatus that produces pulsed RF power (column 6, lines 19-35; figure 3; column 3, lines 45-65). It would have been obvious at the time the invention was made to a person having ordinary skill in the art to use the apparatus taught by Wiegand to produce the pulsed RF power required in Chen. By doing so, one would have a reasonable expectation of success, as Wiegand teaches the art recognized suitability of doing such.

Conclusion

THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of

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the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to David Turocy whose telephone number is (571) 272-2940. The examiner can normally be reached on Monday-Friday 8:30-6:00, No 2nd Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Timothy Meeks can be reached on (571) 272-1423. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

David Turocy
AU 1762


BRET CHEN
PRIMARY EXAMINER